AMENDED CLAIMS

1. A method of producing molecularly imprinted microspheres comprising specific binding sites, c h a r a c t e r i s e d by polymerising functional monomers and crosslinkers in a reaction solvent in the presence of print molecules as templates in a surfactant-free precipitation polymerisation process, which print molecules are capable of forming non-covalent or reversible covalent interactions with said functional monomers.

2. A method according to claim 1, wherein the total volume of polymerisable monomers and crosslinkers is kept in the range of about 0.01 to 20 % of the volume of the reaction solvent.

3. A method according to claim 1 or 2, wherein the reaction solvent is aqueous or non-aqueous.

4. A method according to claim 1 or 1, wherein said reaction solvent is composed of a single solvent component or of multiple solvent components.

5. A method according to claim 1, wherein said functional monomers have the same functionality.

6. A method according to claim 1, wherein said functional monomers have different functionality.

7. A method according to claim 1 or 2, wherein the solubility of the print molecules in the reaction solvent is adjusted by changing the composition of the reaction solvent.

8. A method according to claim 1, wherein the polymerisation is induced by heat, UV radiation, γ radiation and/or chemically.

9. A method according to claim 1, wherein said polymerisation process is a free-radical polymerisation process, an ionic polymerisation process, a coordination polymerisation process or a step growth polymerisation process.

10. A method according to claim 1 or 2, wherein a desired size of the microspheres is achieved by controlling the nucleation and particle growth process.

11. A method according to claim 10, wherein the control of the nucleation and particle growth process is achieved by adjusting the composition of the functional monomer/crosslinker/solvent system and/or the reaction conditions during the polymerisation in order to change the solubility of the growing polymer chains.

12. A method according to claim 10, wherein the control of the nucleation and particle growth process is such as to avoid aggregation of the microspheres.

13. A method according to claim 1 or 2, wherein the size of the microspheres as produced is in the range of 0.01-10μm.

14. A method according to claim 1 or 2, wherein the reaction conditions are controlled so that the microsperes become monodisperse.

15. Use of the molecularly imprinted microspheres as prepared according to any one of claims 1-14, for screening of chemical libraries, for catalysis, for facilitating synthesis, for analyte determination using ligand binding assays and/or agglutination assays, for therapeutic purposes, or for controlled release.

16. Use of the molecularly imprinted microspheres as prepared according to any one of claims 1-14, as stationary phase or modifier in capillary electrophoresis, capillary electrochromatography or HPLC analysis.

17. Use of the molecularly imprinted microspheres as prepared according to any one of claims 1-14, as recognition component in biomimetic sensors.

18. Use of the molecularly imprinted microspheres as prepared according to any one of claims 1-14, as affinity-labelled probe for targeting cells or other biological material.

19. Use of the molecularly imprinted microspheres as prepared according to any one of claims 1-14, as binding entities for the preparation of composite materials.